WHAT IS CLAIMED IS:

1. An optical waveguide comprising:

a first cladding;

a second cladding; and

a core,

wherein the core is embedded in the first cladding so as to be exposed on one principal surface of the first cladding that is opposed to the second cladding,

the first cladding and the second cladding are arranged so as to sandwich the core,

the core is a product formed by a reaction in which a polymeric material that comprises branched polysilane and polysiloxane is subjected to at least one process selected from heating and ultraviolet irradiation, and

a refractive index of the core is higher than refractive indices of the first cladding and the second cladding.

2. The optical waveguide according to claim 1, wherein the refractive index of the second cladding is substantially equal to that of the first cladding.

3. The optical waveguide according to claim 1, wherein the first cladding and the second cladding are glass.

4. The optical waveguide according to claim 1, wherein an adhesive layer is formed between the first cladding including the core and the second cladding.

5. The optical waveguide according to claim 4, wherein the adhesive layer comprises a polymeric material that includes branched polysilane and polysiloxane.

6. The optical waveguide according to claim 4, wherein a refractive index of the adhesive layer is substantially equal to or higher than that of the second cladding.

7. A method for manufacturing an optical waveguide comprising:

heating and softening a first cladding;

forming a groove in the first cladding as a core by pressing a molding die onto the first cladding;

filling the groove with a core material comprising a polymeric material that comprises branched polysilane and polysiloxane;

heating the core material to cause a reaction that changes a refractive index of the core material; and

bonding a second cladding to a surface of the first cladding that is provided with the groove.

8. The method according to claim 7, wherein the first cladding and the second cladding are glass.

9. The method according to claim 7, wherein a refractive index of the second cladding is substantially equal to that of the first cladding.

10. The method according to claim 7, wherein the core material is a resin solution comprising the polymeric material and a solvent,

the core material of the resin solution is applied to the surface of the first cladding that is provided with the groove, and the groove is filled with the core material,

the core material is heated to change the refractive index, and the core material other than that filled in the groove is removed by polishing, and

the second cladding is bonded to the surface of the first cladding that is provided with the groove by direct bonding after the polishing.

11. The method according to claim 10, wherein an adhesive is applied to at least one of the surface of the first cladding that is provided with the groove and the surface of the second cladding that is bonded to the first cladding after the removal of the core material by polishing, the adhesive having a refractive index substantially equal to that of the second cladding, and

the first cladding and the second cladding are bonded together via the adhesive.

12. The method according to claim 7, wherein the core material is a

resin solution comprising the polymeric material and a solvent,

the core material of the resin solution is applied to at least one of the surface of the first cladding that is provided with the groove and the surface of the second cladding that is bonded to the first cladding,

the core material is pressed between the first cladding and the second cladding, and then is heated to change the refractive index,

the groove is filled with the core material, and

the first cladding and the second cladding are bonded together via the core material.

13. The method according to claim 7, wherein the core material is a resin solution comprising at least the polymeric material and a solvent,

the core material of the resin solution is applied to at least one of the surface of the first cladding that is provided with the groove and the surface of the second cladding that is bonded to the first cladding, and then is heated to evaporate the solvent, and

the heating is started at a temperature of not more than a boiling point of the solvent, and the temperature is increased to a temperature less than a temperature at which the reaction that changes the refractive index of the core material is started.

14. The method according to claim 7, wherein the core material is a film comprising at least the polymeric material,

the core material of the film is deposited on at least one of the surface of the first cladding that is provided with the groove and the surface of the second cladding that is bonded to the first cladding,

the core material is pressed between the first cladding and the second cladding, and then is heated to change the refractive index,

the groove is filled with the core material, and

the first cladding and the second cladding are bonded together via the core material.

15. The method according to claim 7, wherein the core material is a liquid polymeric material comprising at least branched polysilane and polysiloxane,

the core material of the liquid polymeric material is dropped on at least one of the surface of the first cladding that is provided with the groove

and the surface of the second cladding that is bonded to the first cladding,

the core material is pressed between the first cladding and the second cladding, and then is heated to change the refractive index,

the groove is filled with the core material, and

the first cladding and the second cladding are bonded together via the core material.